PATENT ABSTRACTS OF JAPAN

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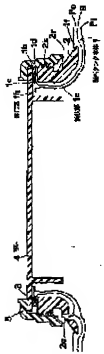
(54) OPENING PART STRUCTURE OF FUEL TANK AND METHOD OF MAKING FUEL TANK HAVING THIS OPENING PART STRUCTURE



(57)Abstract:
PROBLEM TO BE SOLVED: To surely prevent fuel from permeating through a resin member in an opening part, relating to a fuel tank formed of a resin member having a plurality of layers.
SOLUTION: A fuel tank main unit 1 is formed by blow molding a resin member having a plurality of layers, and an opening part 1h is integrally formed. A tubular part 1e extended outward the fuel tank main unit in the opening part and an overlapped part 1d extending a bending part 1b in a direction diametrically spreading the opening part from a tip end of this tubular part to have an external surface in parallel to an opening surface of the opening part are formed. A compression part 1c is formed by compressing partly the overlapped part 1d. This compression part 1c, by generating a smooth surface while thickness of the resin member is thinned by compression, can ensure good seal performance. In addition, in the case that the compression part 1c constitutes an annular groove, a seal member 3 can be arranged.

CLAIMS

[Claim(s)]

[Claim 1]Opening structure of a fuel tank which forms an opening in a fuel tank body formed by a resin member characterized by comprising the following which has two or more layers in one.

A tubed part which extends to a method of the outside of said fuel tank body in said opening.

A lapped part which a bend part extends in the direction which expands the diameter of said opening from a tip of this tubed part, and has an outside surface parallel to an effective area of said opening.

A compression zone which compressed this at least a part of lapped part in the direction vertical to said effective area.

[Claim 2]Opening structure of the fuel tank possessing a ring member arranged so that said opening may be surrounded and said lapped part and said tubed part may be contacted according to claim 1.

[Claim 3]Opening structure of the fuel tank according to claim 1, wherein said compression zone constitutes a circular sulcus located in the diameter direction outside of said opening to said tubed part.

[Claim 4]Carry out blow molding of the resin member which has two or more layers, and form a fuel tank body, and. In a manufacturing method of a fuel tank formed in one, an opening at the time of blow molding of said fuel tank body. A tubed part which extends to a method of the outside of said fuel tank body in said opening is formed, After bulging this at least a part of tubed part on the diameter direction outside, form a bend part which compresses a bulged part and is bent on the diameter direction outside of said opening, form a lapped part which has an outside surface parallel to an effective area of said opening, and. A manufacturing method of a fuel tank compressing this at least a part of lapped part, and forming a compression zone.

[Claim 5]Carry out blow molding of the resin member which has two or more layers, and form a fuel tank body, and. So that a portion which should form said opening may be surrounded in a manufacturing method of a fuel tank which forms an opening in one, Blow molding is performed in the state where a ring member of a section U shape opened on the diameter direction outside has been arranged, After bulging a tip part which forms said tubed part inside said ring member, and is not surrounded by said ring member of said tubed part on the diameter direction outside, A manufacturing method of a fuel tank forming a bend part which compresses a bulged part and is bent on the diameter direction outside of said opening, forming a lapped part which has an outside surface parallel to an effective area of said opening, and compressing this at least a part of lapped part, and forming a compression zone.

[Claim 6]A manufacturing method of the fuel tank according to claim 4 or 5 forming said compression zone in the diameter direction outside of said opening to said tubed part.

[Claim 7]A manufacturing method of the fuel tank according to claim 4 or 5 forming said compression zone inside [diameter direction] said opening to said tubed part.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention carries out blow molding of the resin member which has two or more layers especially about the manufacturing method of the fuel tank which has the opening structure of a fuel tank, and its opening structure, and forms a fuel tank body, and it relates to opening structure of the fuel tank which forms an opening in one, and a manufacturing method for the same.

[0002]

[Description of the Prior Art]In the fuel tank carried in a car etc., resinification progresses, carry out blow molding of the resin member, and a fuel tank body is formed, and the method of forming an opening in one spreads, and the fuel tank made of resin which has an opening of a desired structure has spread. About the opening structure of such a fuel tank, it is indicated by JP,4-7925,U, for example, the conventional structure is indicated in the Drawing 3, and the structure which held down the height of the opening peripheral wall to the Drawing 1 is indicated. In the gazette, it is supposed that sufficiently big capacity can be secured to the limited overall height by providing engagement parts, such as a nut, in the lid mounting base joined to the tank body, making engagement part articles, such as a bolt, engage with this, and covering it the structure fixed to a tank body. The structure same as conventional technology as a thing given in the above-mentioned gazette is indicated also in the patent No. 2906701 gazette.

[0003]On the other hand, about the resin member which constitutes a fuel tank, the resin member which has two or more layers like a statement is used for JP,61-83509,U, for example. The multilayer blow molding tank using the multilayer sheet member which pasted the component of two or more sheets together to the gazette via the adhesives layer is indicated.

[0004]

[Problem(s) to be Solved by the Invention]Like the statement to above-mentioned JP,61-83509,U, when manufacturing the fuel tank made of resin, the resin member which has two or more layers is used. This is what joined with adhesives etc. intensity attachment components, such as high density polyethylene holding the intensity as a fuel tank, and the barrier materials which prevent the penetration of fuel, by carrying out blow molding of this resin member, a fuel tank is formed and an opening is also

formed simultaneously. And although an opening will be covered by a lid like a statement in a gazette shown above, two or more layers may expose the end face of an opening in a tank body. In this case, there is a possibility that fuel may be revealed outside via the intensity attachment component of the outermost layer of a resin member.

[0005]In JP,4-7925,U shown above, although infixing packing and joining together in engagement part articles, such as a bolt, is proposed, sealing nature high packing, bolt, etc. are needed separately when joining a lid. And even if it used packing excellent in the permeation preventing function, we are anxious about disclosure of the fuel through the outermost layer of the resin member.

[0006]Then, this invention makes it a technical problem to provide the opening structure of the fuel tank which can prevent fuel from penetrating via a resin member in an opening certainly about the fuel tank formed by the resin member which has two or more layers.

[0007]This invention carries out blow molding of the resin member which has two or more layers, and forms a fuel tank body, and it makes it another technical problem to provide the manufacturing method of the fuel tank which has the opening structure which can ensure prevention from a penetration of fuel in the manufacturing method of the fuel tank which forms an opening in one.

[0008]

[Means for Solving the Problem]In order to solve the above-mentioned technical problem, opening structure of a fuel tank of this invention, In opening structure of a fuel tank which forms an opening in a fuel tank body formed like by the resin member according to claim 1 which has two or more layers in one, A tubed part which extends to a method of the outside of said fuel tank body in said opening, and a lapped part which a bend part extends in the direction which expands the diameter of said opening from a tip of this tubed part, and has an outside surface parallel to an effective area of said opening, Suppose that it has a compression zone which compressed this at least a part of lapped part in the direction vertical to said effective area. Therefore, it is good also as said compression zone to continue all over said lapped part.

[0009]It is good also as providing the ring member according to claim 2 arranged so that said opening may be surrounded and said lapped part and said tubed part may be contacted like. Said compression zone is good also as constituting the circular sulcus according to claim 3 located in the diameter direction outside of said opening to said tubed part like. And it is good to allocate a sealing member in said circular sulcus.

[0010]A manufacturing method of a fuel tank of this invention carries out blow molding

of the resin member according to claim 4 which has two or more layers like, and forms a fuel tank body, and. In a manufacturing method of a fuel tank formed in one, an opening at the time of blow molding of said fuel tank body. A tubed part which extends to a method of the outside of said fuel tank body in said opening is formed, After bulging this at least a part of tubed part on the diameter direction outside, form a bend part which compresses a bulged part and is bent on the diameter direction outside of said opening, and a lapped part which has an outside surface parallel to an effective area of said opening is formed, and suppose that this at least a part of lapped part is compressed, and a compression zone is formed.

[0011]A manufacturing method of a fuel tank of this invention carries out blow molding of the resin member according to claim 5 which has two or more layers like, and forms a fuel tank body, and. So that a portion which should form said opening may be surrounded in a manufacturing method of a fuel tank which forms an opening in one, Blow molding is performed in the state where a ring member of a section U shape opened on the diameter direction outside has been arranged, After bulging a tip part which forms said tubed part inside said ring member, and is not surrounded by said ring member of said tubed part on the diameter direction outside, Form a bend part which compresses a bulged part and is bent on the diameter direction outside of said opening, and a lapped part which has an outside surface parallel to an effective area of said opening is formed, and it is good also as compressing this at least a part of lapped part, and forming a compression zone.

[0012]said compression zone -- being according to claim 6 -- even if it forms in the diameter direction outside of said opening to said tubed part like -- being according to claim 7 -- it may form inside [diameter direction] said opening to said tubed part like.

[0013]

[Embodiment of the Invention]Hereafter, the desirable embodiment of this invention is described with reference to drawings. Drawing 1 shows one embodiment of the opening structure of the fuel tank of this invention, and shows drawing 2 some of the sections. Although the fuel tank body 1 is formed by carrying out blow molding of the resin member which has two or more layers and the opening 1h is formed in one, a manufacturing method is later mentioned for the fuel tank of this embodiment.

[0014]If the composition near the opening 1h is explained first, as shown in drawing 1 and drawing 2, The lapped part 1d which the bend part 1b extends in the direction which expands the diameter of the opening 1h, and has an outside surface parallel to the effective area Sh which is the opening 1h is formed from the tip of the tubed part 1e which extends to a way outside the fuel tank body 1 by the opening 1h, and this

tubed part 1e. And a part of lapped part 1d is compressed, and the compression zone 1c is formed. Hatching of the resin member which constitutes the fuel tank body 1 in drawing 1 is omitted.

[0015]As expanded and shown in drawing 2, the interlayer B formed with barrier materials between outer layer Po and the inner layer Pi which were formed by the intensity attachment component is infixed, and the resin member which constitutes the fuel tank body 1 is a resin member of the multilayer structure which has two or more layers to which these were joined with adhesive resin. As an intensity attachment component used by this embodiment, ultrahigh-molecular-weight (high-density) polyethylene is used, and EVOH (resin in which vinyl alcohol carried out copolymerization to ethylene) is used as barrier materials, for example. As long as it is the material which does not limit such materials in this invention and has the gas barrier property which can prevent the penetration of fuel, such as gasoline, certainly as barrier materials, what kind of thing may be used.

[0016]Since the bend part 1b is bent inside (opening side) as an enlarged section is shown in drawing 2, even if fuel penetrates the inner layer Pi, it will be appropriately intercepted by barrier layer B of the bend part 1b. And the compression zone 1c constitutes a circular sulcus, and especially the thickness of outer layer Po compares it with it of the tubed part 1e, and it is formed quite thinly. Thus, since the thickness of outer layer Po is thin by the compression zone 1c and the channel is narrow, it becomes the resistance at the time of fuel penetrating from the open end side 1p. On the other hand, in the opening structure which does not have the compression zone 1c, since the open end side (equivalent to 1p of drawing 2) of the resin member of multilayer structure can be open for free passage with outer space as it is, even if a sealing member is allocated between the lid 4 and the holddown member 5, there will be a possibility that fuel may penetrate via outer layer Po. although the bend part 1b may moreover be theoretically reached via the thin portion of the compression zone 1c via outer layer Po in this embodiment from the open end side 1p side -- actual -- **** -- it is small and is the quantity which can be disregarded substantially.

[0017]Are arranged so that the ring member 2 may surround the opening 1h, the inside contacts the lateral surface of the tubed part 1e, and it has adhered so that an upper bed side may contact the undersurface which is the lapped part 1d. The ring member 2 also has a U-shaped section opened on the diameter direction outside by the product made of resin, and as shown in drawing 3 and drawing 4, it is formed. That is, the crevice 2r is formed in a periphery and the both-ends side of shaft orientations is formed in parallel. 2 s of thread parts are formed in the upper outside side of drawing

4, and two or more communicating holes (it represents and expresses with 2c) which cover the perimeter and carry out an opening to shaft orientations so that clearly [drawing 3] are formed.

[0018]The ring member 2 constituted in this way surrounds the opening 1h, as shown in drawing 1 and drawing 2, it is arranged so that the tubed part 1e and the lapped part 1d may be contacted, and it is joined to outer layer Po in one. That is, a resin member invades in the communicating hole 2c at the time of shaping, and it is being fixed so that it may not rotate to the tubed part 1e. Outer layer Po extends and the suspending portion 1f is formed so that a part of peripheral end of the ring member 2 may be covered.

[0019]In the opening 1h constituted as mentioned above, since the compression zone 1c constitutes the circular sulcus, If it equips with the annular holddown member 5 which has a thread part inside and screws in 2 s of thread parts of the ring member 2 after accommodating the annular sealing members 3, such as rubber, in the compression zone 1c as shown in drawing 1, and laying the lid 4 on it, it is fixed so that the lid 4 may stick to the upper surface of the lapped part 1d via the sealing member 3. Since the ring member 2 is being fixed at this time so that it may not rotate to the tubed part 1e, it does not rotate, when screwing the holddown member 5.

[0020]In [** and] the opening structure of the fuel tank of this embodiment, Structurally, since the exterior and the portion which can be opened for free passage turn into only a portion which are a contact part with the sealing member 3, the lid 4, and the lapped part 1d, and outer layer Po of the resin members of multilayer structure, and was thinly formed by the compression zone 1c, the fuel in a fuel tank can prevent the penetration of fuel certainly. Since surface roughness of the bottom [especially] of the compression zone 1c improves and it is a smooth field by compression, it can secure good sealing nature.

[0021]Drawing 5 and drawing 6 explain an example of the manufacturing process of a fuel tank which has the above-mentioned opening structure, and multilayer parison PT which comprised a resin member of the above-mentioned multilayer structure is first arranged in the metallic mold D1 and D2 in the forming cycle of drawing 5. As a two-dot chain line shows to drawing 5, the metallic mold D1 is directed to the sliding direction of drawing 5 movable to the metallic mold D2, and, inside, the heights D1r and the crevice D2r are formed, respectively. The heights D1r are formed in the shape which can form the compression zone 1c shown in drawing 2, and the crevice D2r is formed in the shape which can accommodate the ring member 2. To the axis (namely, axis of the opening 1h) of the metallic mold D1, spacer SP is stationed so that an

attitude to a perpendicular direction is possible, and at the time of a pressing operation, it functions as the ability of the ring member 2 to be held in the crevice 2r of the ring member 2. Spacer SP is constituted so that movement of the metallic mold D1 may be followed and it may move in the direction vertical to the axis of the metallic mold D1. And separately, via the communicating tube (not shown), it is constituted so that pneumatic pressure or fluid pressure may be given inside multilayer parison PT.

[0022]**(ing) and pneumatic pressure or fluid pressure being given in multilayer parison PT, the metallic mold D1 slides to the metallic mold D2, and it drives to a ring member 2-way. Simultaneously, movement of the metallic mold D1 is followed, spacer SP drives in the vertical direction to the axis of the metallic mold D1, and it is held in the crevice 2r of the ring member 2. As a result, as shown in drawing 5, multilayer parison PT bulges, and bulge of the portion which contacts the ring member 2 is controlled, and the tubed part 1e is formed. As shown in drawing 6, the bend part 1b and the lapped part 1d are formed with good accuracy of form. The lapped part 1d is compressed by the heights D1r of the metallic mold D1, and the compression zone 1c is formed of them. Although the covering device 1g is also formed at this time, this is removed behind.

[0023]Drawing 7 shows the opening structure of the fuel tank concerning other embodiments of this invention, continues all over the lapped part 1d, compresses it, and makes the whole lapped part 1d a compression zone. Since the surface roughness of the outside surface (upper surface of drawing 7) of the lapped part 1d improves and it becomes a smooth field by constituting in this way, good sealing nature is securable, and also if the surface roughness of the rear face of the lid 3 is suitable, good sealing nature can be secured, without infixing a sealing member separately.

[0024]Drawing 8 shows the opening structure of the fuel tank concerning the embodiment of further others of this invention, and is provided with the ring member 2 in which 2 t of projections were formed up, and if the lapped part 1d is compressed, compression zone 1cu will be formed in the undersurface of the lapped part 1d. Thereby, since the thickness of outer layer Po becomes thin by compression zone 1cu and a channel becomes narrow, it becomes the resistance at the time of fuel penetrating from the open end side 1p. Since the surface roughness of the outside surface (upper surface of drawing 8) of the lapped part 1d of the compression zone 1cu upper part improves and it becomes a smooth field, good sealing nature is securable.

[0025]Drawing 9 shows the opening structure of the fuel tank which enabled it to perform easily removal of 1 g of lid members saved at the time of shaping to the

embodiment of drawing 8 of this invention, and compression zone 1ci is formed in the lapped part 1d upper surface inside [diameter direction] the opening 1h at the time of compression. Thus, by giving shearing force to the compression zone 1ci portion which became thin, 1 g of lid members are easily removable.

[0026]

[Effect of the Invention]Since this invention is constituted as mentioned above, it does the following effects so. Namely, in the opening structure of the fuel tank of this invention, The tubed part according to claim 1 which extends to the method of the outside of a fuel tank body in an opening like, The lapped part which a bend part extends in the direction which expands the diameter of an opening from the tip of a tubed part, and has an outside surface parallel to the effective area of an opening, It has the compression zone which compressed at least a part of lapped part in the direction vertical to an effective area, and since the thickness of the resin member which has two or more layers which can be set to this compression zone is formed thinly, fuel can be certainly prevented from penetrating via a resin member in an opening.

[0027]In the opening structure of the fuel tank according to claim 2, since the ring member is provided, a tubed part and a lapped part are supported appropriately, rigidity increases, and good sealing nature can be secured.

[0028]In the opening structure of the fuel tank according to claim 3, since the compression zone is formed so that the circular sulcus located in a tubed part at the diameter direction outside of the regio oralis for dehiscence may be constituted, if a sealing member is arranged to this, much more good sealing nature is securable.

[0029]Like a statement the manufacturing method of the fuel tank of this invention to claim 4, At the time of the blow molding of a fuel tank body, the tubed part which extends to the method of the outside of a fuel tank body in an opening is formed, After bulging at least a part of tubed part on the diameter direction outside, form the bend part which compresses a bulged part and is bent on the diameter direction outside of an opening, form the lapped part which has an outside surface parallel to the effective area of an opening, and. Since at least the part is compressed and a compression zone is formed, Since the thickness of a compression zone is thinly formed even when a smooth field is not only formed in a compression zone, but the resin member which has two or more layers is used, fuel can be certainly prevented from penetrating via a resin member in an opening, and it can be considered as the opening structure which has good sealing nature.

[0030]So that the portion according to claim 5 which should form an opening like may

be surrounded, If blow molding is performed in the state where the ring member of a section U shape opened on the diameter direction outside has been arranged and a compression zone is formed as mentioned above, Since it can fabricate where it inserted the spacer from the outside of the ring member and a tubed part and a lapped part are supported appropriately, it has good sealing nature and can be considered as the opening structure which can ensure [appropriately and] prevention from a penetration of fuel.

[0031]Since a compression zone can constitute a circular sulcus for said compression zone when [according to claim 6] it forms in a tubed part like at the diameter direction outside of the regio oralis for dehiscence, and a sealing member can be arranged to this, it can be considered as the opening structure which has much more good sealing nature.

[0032]Said compression zone can remove easily the lid member according to claim 7 which may form inside [diameter direction] the regio oralis for dehiscence like at a tubed part, and is saved in this case at the time of shaping.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]It is a sectional view of one embodiment of the opening structure of the fuel tank of this invention.

[Drawing 2]It is a sectional view expanding and showing a part of opening structure of the fuel tank concerning one embodiment of this invention.

[Drawing 3]It is a top view showing a part of ring member with which the fuel tank of one embodiment of this invention is presented.

[Drawing 4]It is a sectional view of the ring member with which the fuel tank of one embodiment of this invention is presented.

[Drawing 5]It is a sectional view explaining the bulge process of the opening of the fuel tank in one embodiment of the manufacturing method of this invention.

[Drawing 6]It is a sectional view explaining the pressing operation of the opening of the fuel tank in one embodiment of the manufacturing method of this invention.

[Drawing 7]It is a sectional view expanding and showing a part of opening structure of the fuel tank concerning other embodiments of this invention.

[Drawing 8]It is a sectional view expanding and showing a part of opening structure of the fuel tank concerning the embodiment of further others of this invention.

[Drawing 9]It is a sectional view expanding and showing a part of opening structure of the fuel tank concerning another embodiment of this invention.

[Description of Notations]

1 A fuel tank body and 1e [A lapped part and 2 / A ring member, 3 sealing members, four lids, and 5 / A holddown member and Po / An outer layer and Pi / A inner layer, B interlayer, and PT / Multilayer parison, D1, and D2 / A metallic mold and SP / Spacer] A tubed part and 1b A bend part and 1c A compression zone and 1 d

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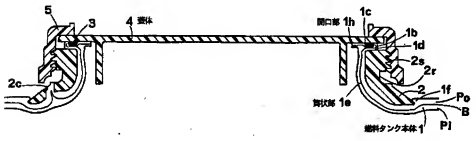
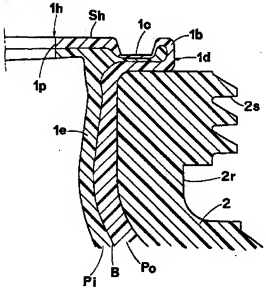
DRAWINGS

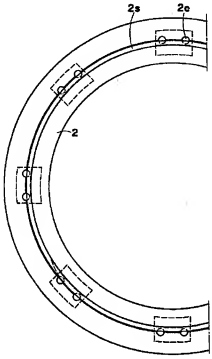
[Drawing 1]



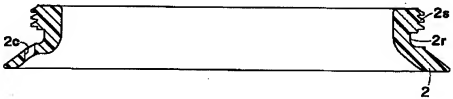
[Drawing 2]



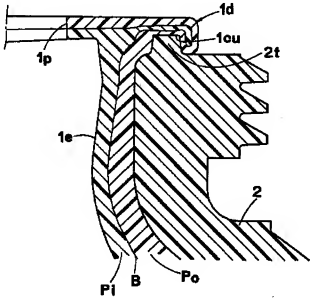
[Drawing 3]



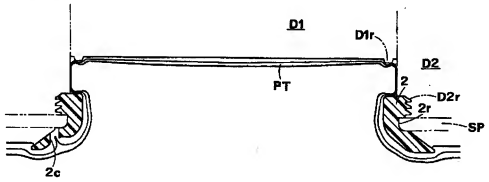
[Drawing 4]



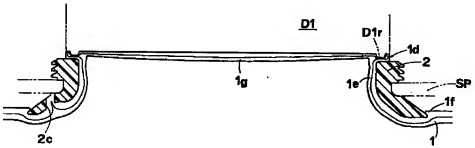
[Drawing 8]



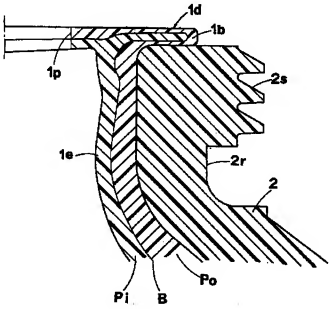
[Drawing 5]



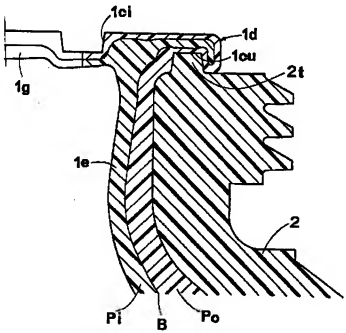
[Drawing 6]



[Drawing 7]



[Drawing 9]



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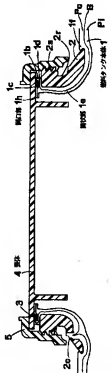
弁理士　池田　一眞

最終頁に続く

(54)【発明の名称】　燃料タンクの開口部構造及びその開口部構造を有する燃料タンクの製造方法

(57)【要約】
【課題】　複数の層を有する樹脂部材で形成する燃料タンクに関し、開口部において樹脂部材を介して燃料が透過することを確実に防止する。
【解決手段】　複数の層を有する樹脂部材をブロー成形することによって燃料タンク本体１を形成すると共に、開口部１ｈを一体的に形成する。開口部にて燃料タンク本体の外方に延出する筒状部１ｅと、この筒状部の先端から開口部を拡径する方向に折曲部１ｂが延出し開口部の開口面に平行な外面を有する重合部１ｄを形成する。そして、重合部１ｄの一部を圧縮して圧縮部１ｃを形成する。この圧縮部１ｃは、圧縮によって樹脂部材の厚さが薄くなると共に、滑らかな面となるので、良好なシール性を確保することができる。更に、圧縮部１ｃが環状溝を構成する場合にはシール部材３を配置することができる。



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【特許請求の範囲】

【請求項１】　複数の層を有する樹脂部材で形成する燃料タンク本体に開口部を一体的に形成して成る燃料タンクの開口部構造において、前記開口部にて前記燃料タンク本体外方に延出する筒状部と、該筒状部の先端から前記開口部を拡径する方向に折曲部が延出し前記開口部の開口面に平行な外面を有する重合部と、該重合部の少くとも一部を前記開口面に垂直な方向に圧縮した圧縮部とを備えたことを特徴とする燃料タンクの開口部構造。

【請求項２】　前記開口部を囲繞し前記重合部及び前記筒状部に当接するように配置した環状部材を具備することを特徴とする請求項１記載の燃料タンクの開口部構造。

【請求項３】　前記圧縮部が、前記筒状部に対し前記開口部の径方向外側に位置する環状溝を構成することを特徴とする請求項１記載の燃料タンクの開口部構造。

【請求項４】　複数の層を有する樹脂部材をブロー成形して燃料タンク本体を形成すると共に、開口部を一体的に形成する燃料タンクの製造方法において、前記燃料タンク本体のブロー成形時に、前記開口部にて前記燃料タンク本体外方に延出する筒状部を形成し、該筒状部の少くとも一部を径方向外側に膨出させた後、膨出部を圧縮して前記開口部の径方向外側で折曲する折曲部を形成し、前記開口部の開口面に平行な外面を有する重合部を形成すると共に、該重合部の少くとも一部を圧縮して圧縮部を形成することを特徴とする燃料タンクの製造方法。

【請求項５】　複数の層を有する樹脂部材をブロー成形して燃料タンク本体を形成すると共に、開口部を一体的に形成する燃料タンクの製造方法において、前記開口部を形成すべき部分を囲繞するように、径方向外側に開放する断面コ字状の環状部材を配置した状態でブロー成形を行ない、前記環状部材の内側に前記筒状部を形成し、前記筒状部の前記環状部材に囲繞されない先端部を径方向外側に膨出させた後、膨出部を圧縮して前記開口部の径方向外側で折曲する折曲部を形成し、前記開口部の開口面に平行な外面を有する重合部を形成すると共に、該重合部の少くとも一部を圧縮して圧縮部を形成することを特徴とする燃料タンクの製造方法。

【請求項６】　前記圧縮部を、前記筒状部に対し前記開口部の径方向外側に形成することを特徴とする請求項４又は５記載の燃料タンクの製造方法。

【請求項７】　前記圧縮部を、前記筒状部に対し前記開口部の径方向内側に形成することを特徴とする請求項４又は５記載の燃料タンクの製造方法。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、燃料タンクの開口部構造及びその開口部構造を有する燃料タンクの製造方法に関し、特に複数の層を有する樹脂部材をブロー成形して燃料タンク本体を形成すると共に、開口部を一体的に形成する燃料タンクの開口部構造及びその製造方法に係る。

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【０００２】

【従来の技術】自動車等に搭載される燃料タンクにおいては、樹脂化が進み、樹脂部材をブロー成形して燃料タンク本体を形成すると共に、開口部を一体的に形成する方法が普及し、所望の構造の開口部を有する樹脂製の燃料タンクが普及している。このような燃料タンクの開口部構造に関しては、例えば実開平４－７９２５号公報に開示されており、その第３図に従来の構造が記載され、その第１図に開口周壁の高さを抑えた構造が記載されている。同公報においては、タンク本体に接合した蓋取付基部にナット等の係合部を設け、これにボルト等の係合部品を係合させて蓋をタンク本体に固定する構造とすることにより、限られた全高に対して十分大きな容量を確保し得るとしている。また、特許第２９０６７０１号公報にも従来技術として上記公報に記載のものと同様の構造が記載されている。

【０００３】一方、燃料タンクを構成する樹脂部材に関しては、例えば実開昭６１－８３５０９号公報に記載のように複数の層を有する樹脂部材が用いられている。同公報には、接着剤層を介して複数枚の構成材を張り合わせた多層の板部材を用いた多層ブロー成形タンクが開示されている。

【０００４】

【発明が解決しようとする課題】上記実開昭６１－８３５０９号公報に記載のように、樹脂製の燃料タンクを製造する場合には、複数の層を有する樹脂部材が用いられる。これは、燃料タンクとしての強度を保持する高密度ポリエチレン等の強度保持部材と、燃料の透過を防止するバリア材とを接着剤等によって接合したもので、この樹脂部材をブロー成形することによって燃料タンクが形成され、開口部も同時に形成される。そして、開口部は前掲の公報に記載のように蓋体で覆うことになるが、開口部の端面は複数の層がタンク本体内に露呈する場合がある。この場合には、樹脂部材の最外層の強度保持部材を介して燃料が外部に漏洩するおそれがある。

【０００５】前掲の実開平４－７９２５号公報においては、パッキンを介装してボルト等の係合部品で結合することが提案されているが、蓋体の接合に際し、別途シール性の高いパッキンやボルト等が必要となる。しかも、透過防止機能に優れたパッキンを用いたとしても、樹脂部材の最外層を介した燃料の漏洩が懸念される。

【０００６】そこで、本発明は、複数の層を有する樹脂部材で形成する燃料タンクに関し、開口部において樹脂部材を介して燃料が透過することを確実に防止し得る燃料タンクの開口部構造を提供することを課題とする。

【０００７】また、本発明は、複数の層を有する樹脂部材をブロー成形して燃料タンク本体を形成すると共に、

開口部を一体的に形成する燃料タンクの製造方法において、燃料の透過防止を確実に行ない得る開口部構造を有する燃料タンクの製造方法を提供することを別の課題とする。

【０００８】

【課題を解決するための手段】上記の課題を解決するため、本発明の燃料タンクの開口部構造は、請求項１に記載のように、複数の層を有する樹脂部材で形成する燃料タンク本体に開口部を一体的に形成して成る燃料タンクの開口部構造において、前記開口部にて前記燃料タンク本体外方に延出する筒状部と、該筒状部の先端から前記開口部を拡径する方向に折曲部が延出し前記開口部の開口面に平行な外面を有する重合部と、該重合部の少なくとも一部を前記開口面に垂直な方向に圧縮した圧縮部とを備えることとしたものである。従って、前記重合部の全面に亘って前記圧縮部としてもよい。

【０００９】更に、請求項２に記載のように、前記開口部を囲繞し前記重合部及び前記筒状部に当接するように配置した環状部材を具備することとしてもよい。前記圧縮部は、請求項３に記載のように、前記筒状部に対し前記開口部の径方向外側に位置する環状溝を構成することとしてもよい。そして、前記環状溝にシール部材を配設するとよい。

【００１０】また、本発明の燃料タンクの製造方法は、請求項４に記載のように、複数の層を有する樹脂部材をブロー成形して燃料タンク本体を形成すると共に、開口部を一体的に形成する燃料タンクの製造方法において、前記燃料タンク本体のブロー成形時に、前記開口部にて前記燃料タンク本体外方に延出する筒状部を形成し、該筒状部の少くとも一部を径方向外側に膨出させた後、膨出部を圧縮して前記開口部の径方向外側で折曲する折曲部を形成し、前記開口部の開口面に平行な外面を有する重合部を形成すると共に、該重合部の少くとも一部を圧縮して圧縮部を形成することとしたものである。

【００１１】更に、本発明の燃料タンクの製造方法は、請求項５に記載のように、複数の層を有する樹脂部材をブロー成形して燃料タンク本体を形成すると共に、開口部を一体的に形成する燃料タンクの製造方法において、前記開口部を形成すべき部分を囲繞するように、径方向外側に開放する断面コ字状の環状部材を配置した状態でブロー成形を行ない、前記環状部材の内側に前記筒状部を形成し、前記筒状部の前記環状部材に囲繞されない先端部を径方向外側に膨出させた後、膨出部を圧縮して前記開口部の径方向外側で折曲する折曲部を形成し、前記開口部の開口面に平行な外面を有する重合部を形成すると共に、該重合部の少くとも一部を圧縮して圧縮部を形成することとしてもよい。

【００１２】前記圧縮部は、請求項６に記載のように、前記筒状部に対し前記開口部の径方向外側に形成しても、請求項７に記載のように、前記筒状部に対し前記開口部の径方向内側に形成してもよい。

【００１３】

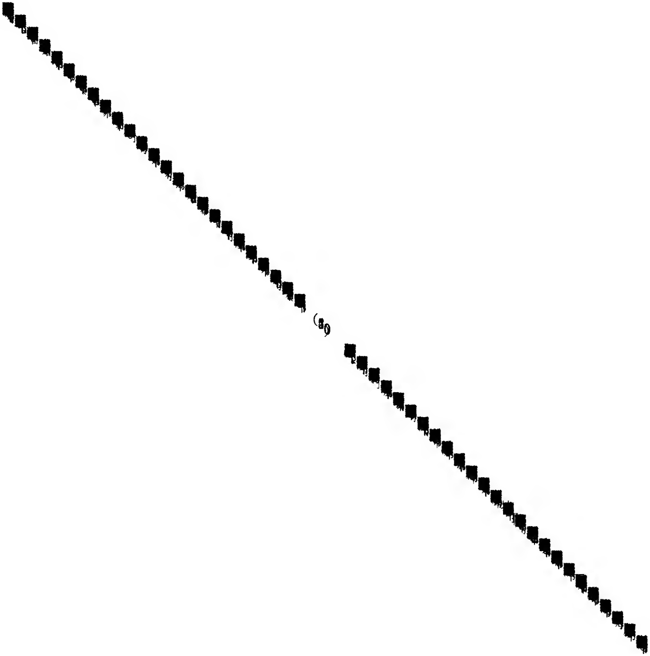
【発明の実施の形態】以下、本発明の望ましい実施形態を図面を参照して説明する。図１は本発明の燃料タンクの開口部構造の一実施形態を示すもので、その一部の断面を図２に示している。本実施形態の燃料タンクは、複数の層を有する樹脂部材をブロー成形することによって燃料タンク本体１が形成されると共に、開口部１ｈが一体的に形成されるが、製造方法については後述する。

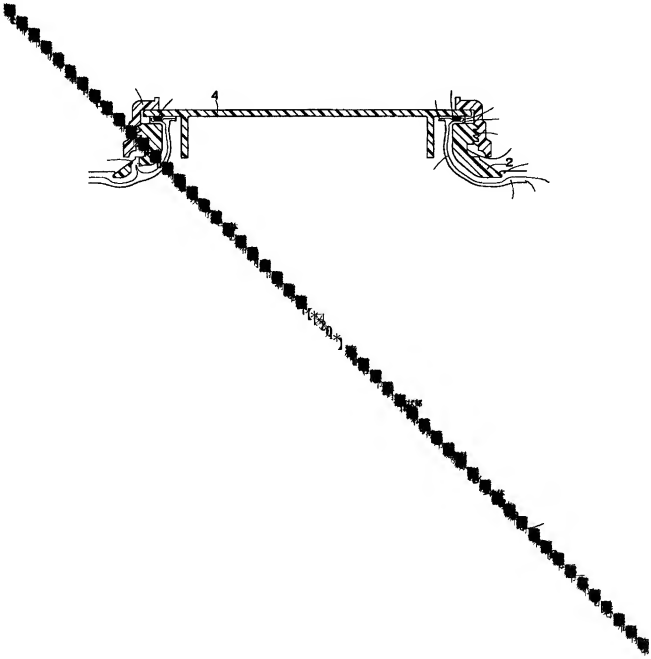
【００１４】先ず開口部１ｈ近傍の構成を説明すると、図１及び図２に示すように、開口部１ｈにて燃料タンク本体１の外方に延出する筒状部１ｅと、この筒状部１ｅの先端から開口部１ｈを拡径する方向に折曲部１ｂが延出し開口部１ｈの開口面Ｓｈに平行な外面を有する重合部１ｄが形成されている。そして、重合部１ｄの一部が圧縮され、圧縮部１ｃが形成されている。尚、図１においては燃料タンク本体１を構成する樹脂部材のハッチングを省略している。

【００１５】図２に拡大して示すように、燃料タンク本体１を構成する樹脂部材は、強度保持部材で形成された外層Ｐｏ及び内層ＰｉとのＩ間にバリア材で形成された中間層Ｂが介装され、これらが接着性樹脂で接合された複数の層を有する多層構造の樹脂部材である。本実施形態で用いられる強度保持部材としては、超高分子量（高密度）ポリエチレンが用いられ、バリア材としては、例えばＥＶＯＨ（エチレンとビニルアルコールとの共重合した樹脂）が用いられる。尚、本発明においてはこれらの材料を限定するものではなく、バリア材としては、ガソリン等の燃料の透過を確実に防止し得るガスバリア性を有する材料であれば、どのようなものでもよい。

【００１６】図２に拡大断面を示すように、折曲部１ｂは内側（開口側）に折曲されているので、仮に燃料が内層Ｐｉを透過しても折曲部１ｂのバリア層Ｂで遮断される。そして、圧縮部１ｃは環状溝を構成し、特に外層Ｐｏの厚さが筒状部１ｅのそれに比し、かなり薄く形成されている。このように、外層Ｐｏの厚さは圧縮部１ｃで薄くなっており、流路が狭くなっているので、燃料が開口端面１ｐから透過する際の抵抗となる。これに対し、圧縮部１ｃを有さない開口部構造においては、多層構造の樹脂部材の開口端面（図２の１ｐに相当）がそのまま外部空間と連通し得るので、たとえ蓋体４と固定部材５との間にシール部材が配設されたとしても、外層Ｐｏを介して燃料が透過するおそれがある。本実施形態では、理論的には、開口端面１ｐ側から外層Ｐｏを介して、しかも圧縮部１ｃの薄い部分を介して折曲部１ｂに到達し得ることになるが、実際には極く僅かであり、実質的に無視し得る量である。

【００１７】更に、環状部材２が開口部１ｈを囲繞するように配置され、内側が筒状部１ｅの外側面に当接するとと共に、上端面が重合部１ｄの下面に当接するように固

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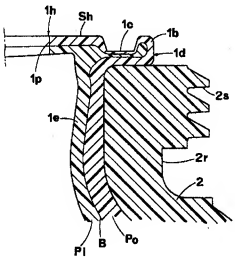
【図２】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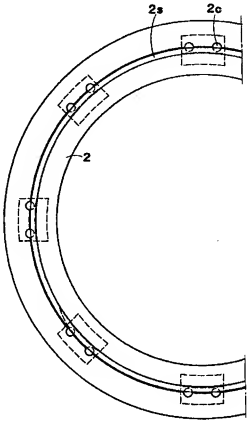
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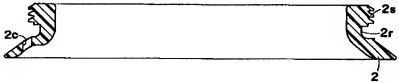
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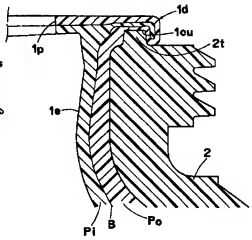
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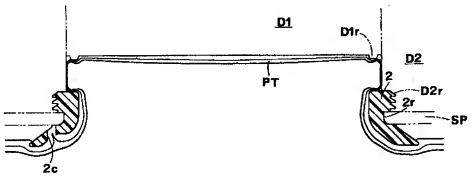
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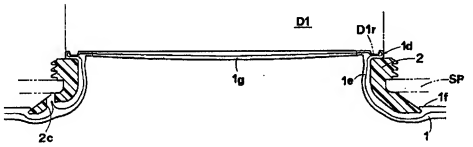
【図６】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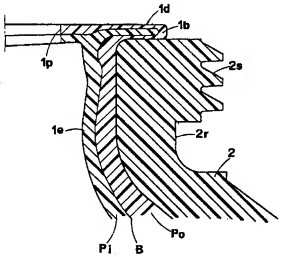
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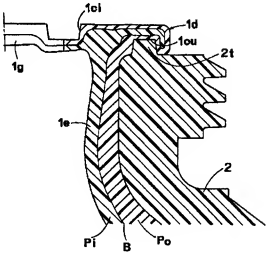
【図９】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AG23 AG28 AH55 LA01 LA08
LB01 LG03 LG06 LG16 LG35
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